REMARKS

Claims 1-8 have been amended to incorporate therein the recitation of claim 4. Claim 4 has been canceled. New claims 9 and 10 depending from claims 1 and 8, respectively, are directed to a preferred embodiment where the at least one element selected from elements of group 3 in a periodic table excluding La is Y, Nb, Sm or Gd, and the at least one element selected from elements of group 2 in a periodic table is Ca and Sr.

Review and reconsideration on the merits are requested.

Claim 1 has been amended to incorporate therein the recitation of claim 4, to thereby obviate the rejection of claims 1 and 5-7 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 6,878,304 to Ogata et al. Withdrawal of the rejection is respectfully requested.

Claims 1-4 and 8 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,403,461 to Tuller et al. The grounds for rejection remain the same as set forth in the previous Office Action.

The Examiner did not consider the previous response to be persuasive because Tuller et al. is said to disclose a sintered body for thermistor devices having a composition overlapping in scope with the rejected claims, and for the reason that the prior art is said to teach compositions containing rare-earth elements other than La in the A-site of the solid solutions/perovskites. Further, the Examiner considered that because the prior art composition ranges overlap with the claimed composition, any benefits associated with controlling the content "a" of the Group II element (claim 2) or the Mn content (claim 3) would be *inherent*.

In response, Applicants respectfully submit that the broadly overlapping formula at column 5 of Tuller et al. does not disclose the claimed subject matter with sufficient

specificity to constitute an anticipation. The present claims exclude La, yet this is expressly allowed by the broad formula of Tuller et al. Likewise, claim 1 excludes any transition metal other than Mn and the at least one element selected from Group 3, yet the broad formula of Tuller et al. allows for the presence of a plurality of transition elements such as Fe and Ni in addition to Mn. Consequently, selection of a composition for a sintered body within the scope of the rejected claims would require one of ordinary skill to pick and choose from a multitude of compositions covered by the broad formula of column 5 of Tuller et al., whereas only a small fraction of these could ever meet the terms of the rejected claims. Particularly, there is nothing in Tuller et al. which would lead one of ordinary skill to exclude La and to exclude any transition metal other than Mn and the at least one element selected from Group 3, where Tuller et al. plainly teaches that B of the solid solution allows for selection of transition metals Cr, Fe, Co, Ni, Cu, Ti, Zr, Hf that are not Group 3 elements in addition to Mn (column 5, lines 29-32 of Tuller et al.).

For all of these reasons, Applicants respectfully disagree that the broad general formula of Tuller et al. anticipates the claimed invention.

Further in this regard, the specific solid solution systems disclosed at column 7, lines 13-19 as well as those disclosed in Examples 1 to 3 of Tuller et al. are also well outside the scope of the claimed invention. Namely, the sintered body of Examples 1 to 3 of Tuller et al. contained Ti specifically excluded from the scope of claims 1 and 8 (as being a transition metal other than Mn and the at least one element selected from elements of Group 3), as well as other shortcomings.

To clarify this distinction, claims 1 and 8 have been amended to incorporate therein the recitation of claim 4, to specifically name the Group 3 (and Group 2) elements.

For this reason alone, it is respectfully submitted that the amended claims define novel subject matter, and withdrawal of the foregoing rejection over Tuller et al. is respectfully requested. Furthermore, Applicants respectfully request the Examiner to enter the proposed amendment constituting the combination of existing claims at this stage of prosecution, as placing the case in condition for allowance.

Applicants further comment on patentability of the present claims as follows.

As set forth in amended claims 1 and 8, the sintered body is substantially free from any transition metal other than Mn and the at least one element selected from elements of Group 3. The significance thereof is that the presence of a transition metal (for example, Fe, Co, Ni or Ti) other than Mn and the at least one element selected from elements of group 3 in the Periodic Table, enlarges the constant B (i.e., a constant serving as an indication of a change in electrical resistance). See page 2, lines 4-6 and page 9, lines 2-5 of the present specification. Because the sintered body is free from Fe, Ti, Co or Ni, the sintered body for thermistor devices according to the invention makes it possible to solve problems such as an excessively large initial electrical resistance in a temperature range of 100°C or an excessively large constant B. As a result, a favorable detection performance can be established over a wide temperature range from a low temperature of around 100°C to a high temperature of 900°C (page 12, lines 4-12 of the specification).

The effect of the presence of a transition metal other than Mn and the at least one element selected from elements of Group 3 in the Periodic Table is demonstrated by reference to the test data presented in the specification together with additional comparative examples, as set forth in a Declaration under 37 C.F.R. § 1.132 submitted herewith.

As set forth in the Declaration, sintered bodies were prepared including a Group 3 element selected from Y, Sm, Nd and Gd; a Group 2 element selected from Ca and Sr; Mn and Al in the indicated amounts; and one of Fe and Ni (i.e., a transition metal other than Mn and the at least one element selected from elements of Group 3 excluding La). The samples thus prepared were evaluated with respect to initial electrical resistance at 100°C and 900°C, electrical resistance after heating at 100°C and 900°C and the change in electrical resistance in terms of temperature (°C) as described at pages 25-27 of the specification, the results of which are set forth in the Table of the Declaration. Particularly, the change in electrical resistance in terms of temperature is calculated in accordance with Formula (3) at page 26 of the specification. A smaller value represents a smaller change in resistance to a heat profile and is therefore advantageous in promoting high temperature detection accuracy.

Comparative Example 7 of composition (YCa)(MnAl**Fe**) having a change in electrical resistance in terms of temperature (°C) of 13 and 15 at 100°C and 900°C, respectively, is directly comparable to Inventive Examples 1 to 15 of the specification having the composition (YCa)(MnAl), each exhibiting a small change in electrical resistance to the heat profile, namely, ±10°C over the entire temperature range as shown in Table 7 at page 30 of the specification.

Comparative Example 8 having the composition (SmSr)(MnAl**Fe**) is directly comparable to inventive Example 16 having the composition (SmSr)(MnAl). As shown in Table 7 at page 30 of the specification, Inventive Example 16 had a very small change in electrical resistance to the heat profile, whereas Comparative Example 3 further containing a small amount of Fe exhibited a large change in electrical resistance to the heat profile exceeding ±10°C over the entire temperature range.

Comparative Example 9 having the composition (NdSr)(MnAl**Fe**) is directly comparative to Inventive Example 20 of the specification having the composition (NdSr)(MnAl). As shown in Table 7 at page 30 of the specification, inventive Example 20 exhibited a very small change in electrical resistance to the heat profile, whereas Comparative Example 9 having the same composition but further containing a small amount of Fe exhibited a large change in electrical resistance to the heat profile exceeding ±10°C over the entire temperature range.

Comparative Example 10 having the composition (GdSr)(MnAl**Fe**) is directly comparative to Inventive Example 21 having the composition (GdSr)(MnAl). As shown in Table 7 at page 30 of the specification, inventive Example 21 exhibited a very small change in electrical resistance to the heat profile, whereas Comparative Example 10 further containing a small amount of Fe exhibited a large change in electrical resistance to the heat profile, namely, in excess of ±10°C over the entire temperature range.

Comparative Example 11 shows that the composition (NdCa)(MnAl**Fe**) also exhibits a large change in electrical resistance to the heat profile exceeding ±10°C over the entire temperature range. Comparative Example 12 likewise shows that addition of Ni in place of Fe likewise results in a very large change in electrical resistance to the heat profile.

The test data discussed above is summarized in the Table below and in the Declaration.

	Comparative Examples	element of group 3				element of group 2			Mn	Al	Fe	Ni	SiO_2	initial electrical resistance (kΩ)		electrical resistance after heating (kΩ)		Change in electrical resistances in terms of temperature (℃)	
		Y	Sm	Nd	Gd	Sr	Ca	Mg						100℃	900℃	100℃	900℃	100℃	900℃
6	(YSr)(MnAlFe)	0.920	–	–	–	0.080	–	–	0.105	0.865	0.030	–	–	1547	0.150	1046	0.141	11	17
7	(YCa)(MnAlFe)	0.920	–	–	–	–	0.080	–	0.105	0.865	0.030	–	–	1980	0.196	1244	0.185	13	15
8	(SmSr)(MnAlFe)	–	0.920	–	–	0.080	–	–	0.114	0.800	0.086	–	–	4148	0.064	2649	0.058	11	22
9	(NdSr)(MnAlFe)	–	–	0.920	–	0.080	–	–	0.114	0.800	0.086	–	–	2726	0.066	1759	0.061	11	20
10	(GdSr)(MnAlFe)	–	–	–	0.920	0.080	–	–	0.114	0.800	0.086	–	–	2735	0.108	1693	0.102	12	15
11	(NdCa)(MnAlFe)	–	–	0.920	–	–	0.080	–	0.163	0.800	0.038	–	–	3489	0.122	1965	0.111	15	24
12	(YSr)(MnAlNi)	0.920	–	–	–	0.080	–	–	0.120	0.820	–	0.060	–	2113	0.079	1076	0.070	18	30

	Inventive Examples	element of group 3				element of group 2			Mn	Al	Fe	Ni	SiO_2	initial electrical resistance (kΩ)		electrical resistance after heating (kΩ)		Change in electrical resistances in terms of temperature (℃)	
		Y	Sm	Nd	Gd	Sr	Ca	Mg						100℃	900℃	100℃	900℃	100℃	900℃
1	(YCa)(MnAl)	0.820	–	–	–	–	0.180	–	0.180	0.820	–	–	–	4.033	0.059	3.656	0.059	7	1
2	(YCa)(MnAl)	0.820	–	–	–	–	0.180	–	0.180	0.820	–	–	–	303.6	0.186	311.0	0.191	-1	-8
3	(YCa)(MnAl)	0.820	–	–	–	–	0.180	–	0.194	0.806	–	–	–	38.77	0.103	33.54	0.101	8	6
4	(YCa)(MnAl)	0.820	–	–	–	–	0.180	–	0.206	0.794	–	–	–	37.35	0.078	31.49	0.076	10	8
5	(YCa)(MnAl)	0.820	–	–	–	–	0.180	–	0.219	0.781	–	–	–	25.15	0.050	21.80	0.050	8	3
6	(YCa)(MnAl)	0.806	–	–	–	–	0.194	–	0.194	0.806	–	–	–	20.63	0.095	21.33	0.097	-2	-9
7	(YCa)(MnAl)	0.794	–	–	–	–	0.206	–	0.206	0.794	–	–	–	16.94	0.067	18.02	0.068	-3	-8
8	(YCa)(MnAl)	0.781	–	–	–	–	0.219	–	0.219	0.781	–	–	–	9.625	0.051	9.268	0.051	2	3
9	(YCa)(MnAl)	0.840	–	–	–	–	0.160	–	0.180	0.820	–	–	–	189.7	0.139	167.8	0.140	5	-2
10	(YCa)(MnAl)	0.840	–	–	–	–	0.160	–	0.194	0.806	–	–	–	125.4	0.109	97.19	0.107	10	5
11	(YCa)(MnAl)	0.840	–	–	–	–	0.160	–	0.206	0.794	–	–	–	212.7	0.081	158.3	0.080	10	3
12	(YCa)(MnAl)	0.840	–	–	–	–	0.160	–	0.219	0.781	–	–	–	73.05	0.055	56.0	0.054	10	6
13	(YCa)(MnAl)	0.940	–	–	–	–	0.060	–	0.180	0.820	–	–	–	1703	0.182	1735	0.186	-1	-6

	Inventive Examples	element of group 3				element of group 2			Mn	Al	Fe	Ni	SiO_2	initial electrical resistance (kΩ)		electrical resistance after heating (kΩ)		Change in electrical resistances in terms of temperature (℃)	
		Y	Sm	Nd	Gd	Sr	Ca	Mg						100℃	900℃	100℃	900℃	100℃	900℃
14	(YCa)(MnAl)	0.940	–	–	–	–	0.060	–	0.219	0.781	–	–	–	512.4	0.082	471.0	0.082	2	0
15	(YCa)(MnAl)	0.960	–	–	–	–	0.040	–	0.180	0.820	–	–	–	1985	0.251	1810	0.247	3	4
16	(SmSr)(MnAl)	0.960	0.820	–	–	0.180	–	–	0.180	0.820	–	–	–	222.9	0.085	203.2	0.085	3	1
17	(Ysr)(MnAl)	0.940	–	–	–	0.060	–	–	0.180	0.820	–	–	–	103.0	0.195	92.32	0.197	5	-3
18	(Ysr)(MnAl)	0.940	–	–	–	0.060	–	–	0.145	0.855	–	–	–	31.26	0.101	30.28	0.100	1	5
19	(Ysr)(MnAl)	0.940	–	–	–	0.040	–	–	0.254	0.746	–	–	–	5.474	0.023	6.098	0.024	-5	-6
20	(NdSr)(MnAl)	–	–	0.820	–	0.180	–	–	0.180	0.820	–	–	–	151.5	0.087	143.0	0.086	2	5
21	(GdSr)(MnAl)	–	–	–	0.82	0.180	–	–	0.180	0.820	–	–	–	142.6	0.143	125.0	0.139	5	8

More particularly, the test data presented in the specification and Declaration submitted herewith demonstrates that the presence of a transition metal other than Mn and the at least one element selected from elements of Group 3 in the Periodic Table excluding La results in a large change in electrical resistance to the heat profile, namely, in excess of ±10°C over the entire temperature range. See page 31, lines 1-3 of the specification.

In summary, claim 1 has been amended to incorporate therein the recitation of claim 4, to thereby obviate the rejection over Ogata et al. Furthermore, for the many reasons given above, it is respectfully submitted that Tuller et al. does not disclose the claimed subject matter with sufficient specificity to constitute an anticipation. To recap, the present claims exclude La, yet this is expressly allowed by the broad, overlapping formula of Tuller et al. Likewise, claim 1 excludes any transition metal other than Mn and at least one element selected from Group 3, yet the formula of Tuller et al. allows for the presence of a plurality of transition elements such as Fe and Ni outside of Group 3 in addition to Mn. Only a very small fraction of the vast number of compositions covered by Tuller et al. could ever meet the terms of the rejected claims. Thus, it is respectfully submitted that the present claims define novel subject matter and are not anticipated by Tuller et al.

Moreover, the unobviousness of the sintered body and thermistor device of the invention which excludes any transition metal other than Mn and the at least one element selected from Group 3 excluding La is evidenced by the small change in electrical resistance to the heat profile, namely, within ±10°C over the entire temperature range, whereas the presence of even a small amount of such transition metal excluded from the scope of the present claims remarkably increases the change in electrical resistance to the heat profile as

demonstrated in the test data presented in the specification and Declaration submitted herewith.

Withdrawal of all rejections and allowance of claims 1-3 and 5-10 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Abraham J. Rosner
Registration No. 33,276

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
WASHINGTON DC SUGHRUE/265550
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